Bay Beach Public Meeting Agenda

- **Opening Remarks:**

  Senator Simpson
- **Introductions**
- **Presentation of Bay Beach Coastal Engineering Evaluation**
- **Public Comment Panel Discussion**

Bay Beach Coastal Drainage Engineering Evaluation

Presented by:
Brooks Cahall, Drainage Program Manager
December 2, 2015

Discussion Topics

- Project Objectives
- Study Area
- Community Outreach
- Identification of Drainage Deficiencies
- Proposed Solutions
  - Relevant Agency
  - Ranking Criteria
- Review of Concept Designs
- Next Steps

Project Objective

DNREC contracted with URS to:

- Evaluate existing drainage problems and provide recommendations to DNREC for Drainage Improvements in 7 Bay Beach Communities
- Focus of the study was to develop small to medium scale drainage solutions to reduce the frequency and duration of flooding.

Project Objectives
Flooding, Drainage, or Stormwater?

Flooding

is the submergence of land that is normally dry and can be caused by rainfall or tidal events

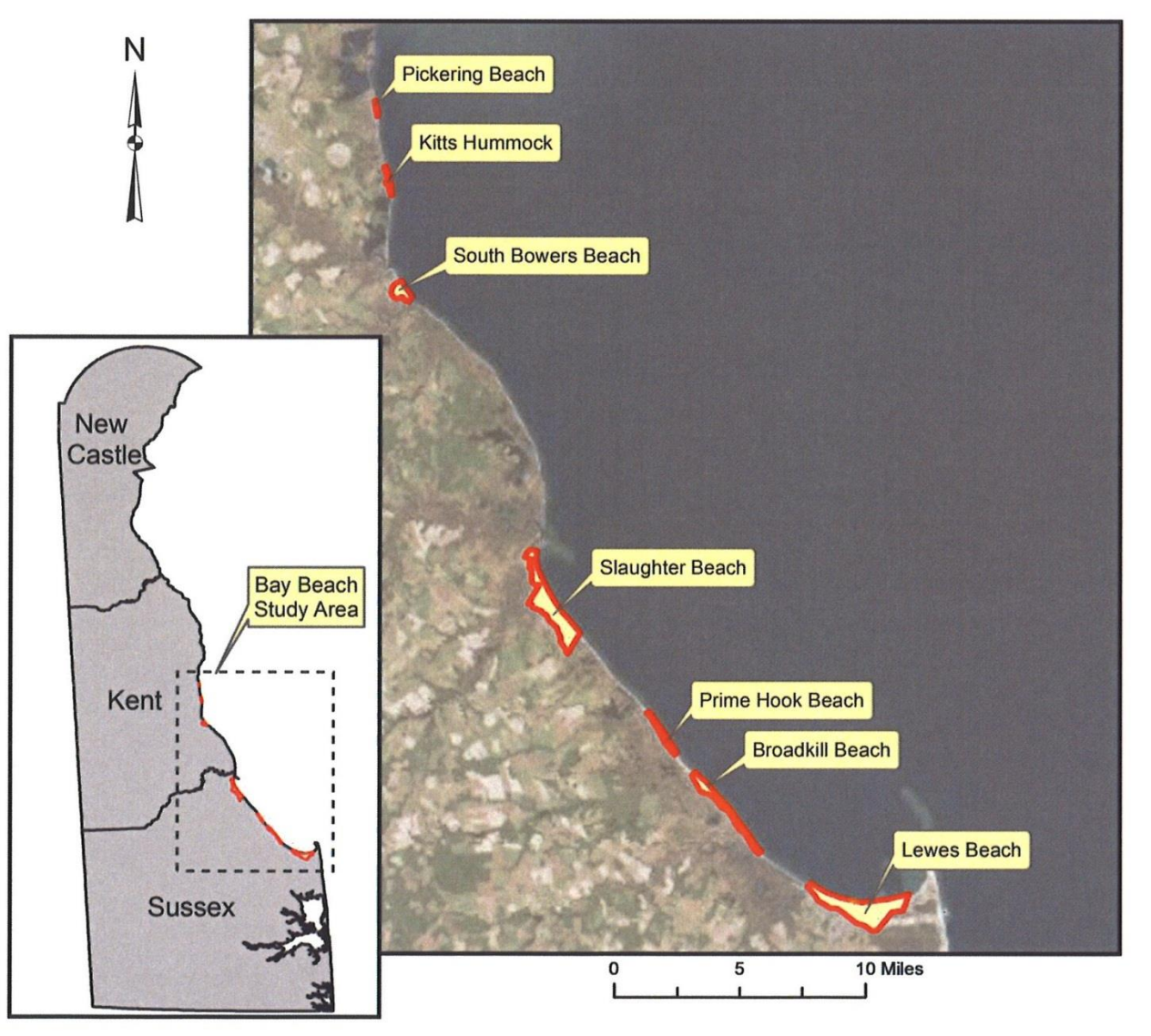
Drainage

Removal of runoff over an acceptable period of time which is typically 24-48 hours

Stormwater Management

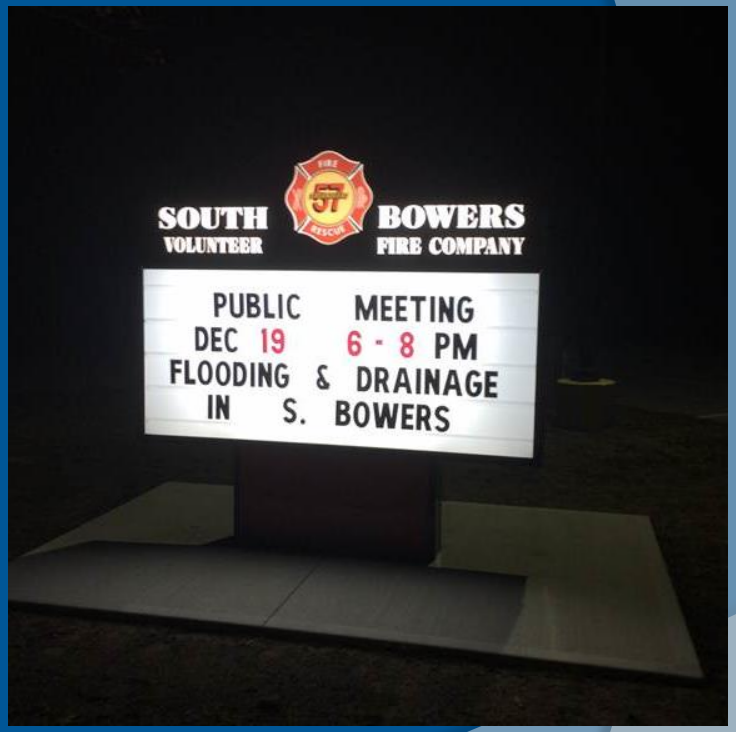
Management of increased runoff caused by a change in land use.

Study Area

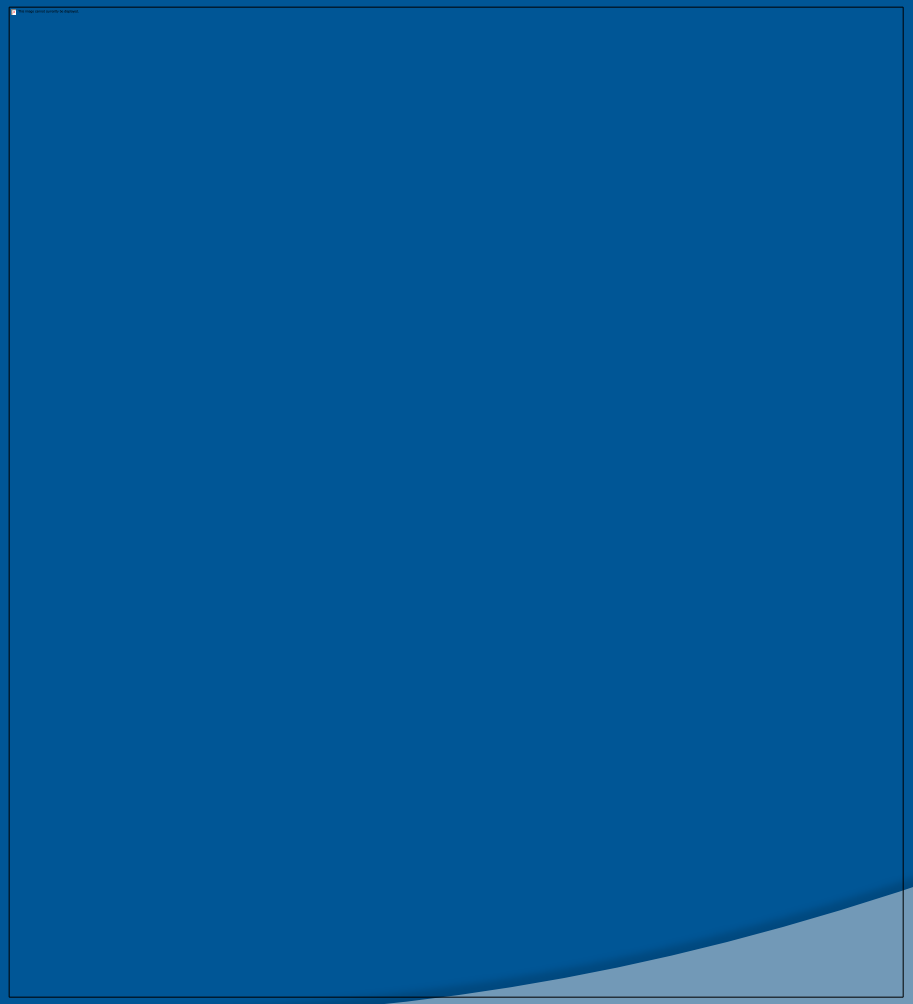

N
Pickering Beach
Kitts Hummock
South Bowers Beach
New Castle
Bay Beach Study Area
Kent
Sussex
Slaughter Beach
Prime Hook Beach
Broadkill Beach
Lewes Beach
0
5
10 Miles

Community Outreach

- Public Meetings
  - Prime Hook
    - April 27, 2013
  - Broadkill Beach
    - October 24, 2013
  - Pickering Beach and Kitts Hummock
    - November 14, 2013
  - Slaughter Beach
    - December 17,2013
  - South Bowers Beach
    - December 19, 2013
  - Lewes Beach
    - February 20, 2014
- Survey
  - Sent to Property Owners in affected area
  - Received 362 responses



Identification of Drainage Concerns



Proposed Solutions

- Identified Concerns were evaluated in the field by URS engineers.
- Concerns were then grouped into 91 proposed solutions
- Relevant Agency was identified by DNREC.
  - DNREC, DelDOT, Private Landowner
- Solutions were prioritized using ranking criteria

Relevant Agency

- DNREC staff reviewed proposed solutions and identified which particular agency should take the lead.
  - DNREC - 39
  - DELDOT – 13
  - Homeowner Implementation – 14
  - Municipality – 12
  - No Solution/Out of Scope
- For Example DNREC doesn't build roads so those types of projects will be handed over to DelDOT.
- Some solutions can be achieve by a particular landowner on their property and DNREC will provide appropriate technical assistance

Prioritization / Ranking Criteria

- Originally Developed by Drainage Sub-Committee of Delaware Bay Beach Work Group
- Public, State, & Legislative Input
- Simplified to remove redundancies and account for survey response data.

Prioritization / Ranking Criteria

Table 6.2: Ranking Criteria for Proposed Solutions

Prioritization Category	Description	Score
PUBLIC SAFETY IMPACTS		
Number of Questionnaires with Observations	0 to 3	0
	4 to 9	6
	10 or more	12
Ingress and Egress	Does not affect	0
	Small vehicles may not be able to pass (6 inches or less of water) [1,2]	6
	Road impassible (6 inches or greater) [1,2]	12
TECHNICAL CRITERIA		
Frequency of Drainage/Flooding (as reported in questionnaires)	Occurs less frequently than every 10 years	2
	Every 2-10 years	4
	Yearly	6
	Several times per year	8
	Monthly	10
Flooding Severity	Yard/driveway flooding	4
	Nuisance road flooding	8
	Structural flooding/road closure	12
Complexity of Solution	Significant impact to utilities, roads (closure), business (closure or interruption), or drainage	0
	Minor impact to utilities, roads (partial closure), or drainage	4
	No impact to utilities, roads, or drainage	8
Easement/Right of Way Requirement	Solution entirely on private property, or requiring more than four easements through private property	0
	Solution primarily on public property, with one to three easements through private property	4
	Solution entirely public property (e.g., DelDOT, DNREC, U.S. Department of Interior)	8

Prioritization / Ranking Criteria

ENVIRONMENTAL/ECOLOGICAL IMPACTS		
Environmental Impact of Proposed Solution	Construction in wetlands or streams, or involves removal of more than 10 trees	0
	Construction on edge of wetlands or streams, or involves removal of 1-9 trees	3
	No impact	6
Environmental Permitting	Required	0
	Not required	6
AGRICULTURAL IMPACTS		
Agricultural Impact	Long term	0
	Short term	4
	None	8
PUBLIC HEALTH IMPACTS		
Septic System Impact	Long term	0
	Short term	4
	None	8
MISCELLANEOUS IMPACTS		
Project Cost	High	0
	Medium	4
	Low	8
Maintenance Cost	High	0
	Medium	4
	Low	8

[1] If there are two or more access roads, multiply score by 0.5
[2] If there is one access road, multiply score by 1

Selection of High Priority Solutions

Based Selection of Projects on the following Factors:

- Relevant Agency (DNREC Only)
- Project Complexity
  - Several high ranked solutions can easily be designed & implemented with DNREC/DelDOT staff
- Interdependence of Solutions
  - Upgrades to Oak Meadows Storm Drain would likely worsen flooding at river road if not addressed

High Priority Solutions

Project	Community	Location	Total Cost
Project #1 *(PB_04)*	*Pickering Beach*	Pickering Beach Rd.	$50,000
Project #2 (KH_06)	*Kitts Hummock*	175 to 187 South Bay Drive	$53,000
Project #3 (KH_07)	*Kitts Hummock*	297 South Bay Drive	$19,000
Project #4 (KH_09)	*Kitts Hummock*	Kitts Hummock Rd.	$83,000
Project #5 (SL_02)	*Slaughter Beach*	Passwaters Drive & Marina Lane	$147,000

High Priority Solutions

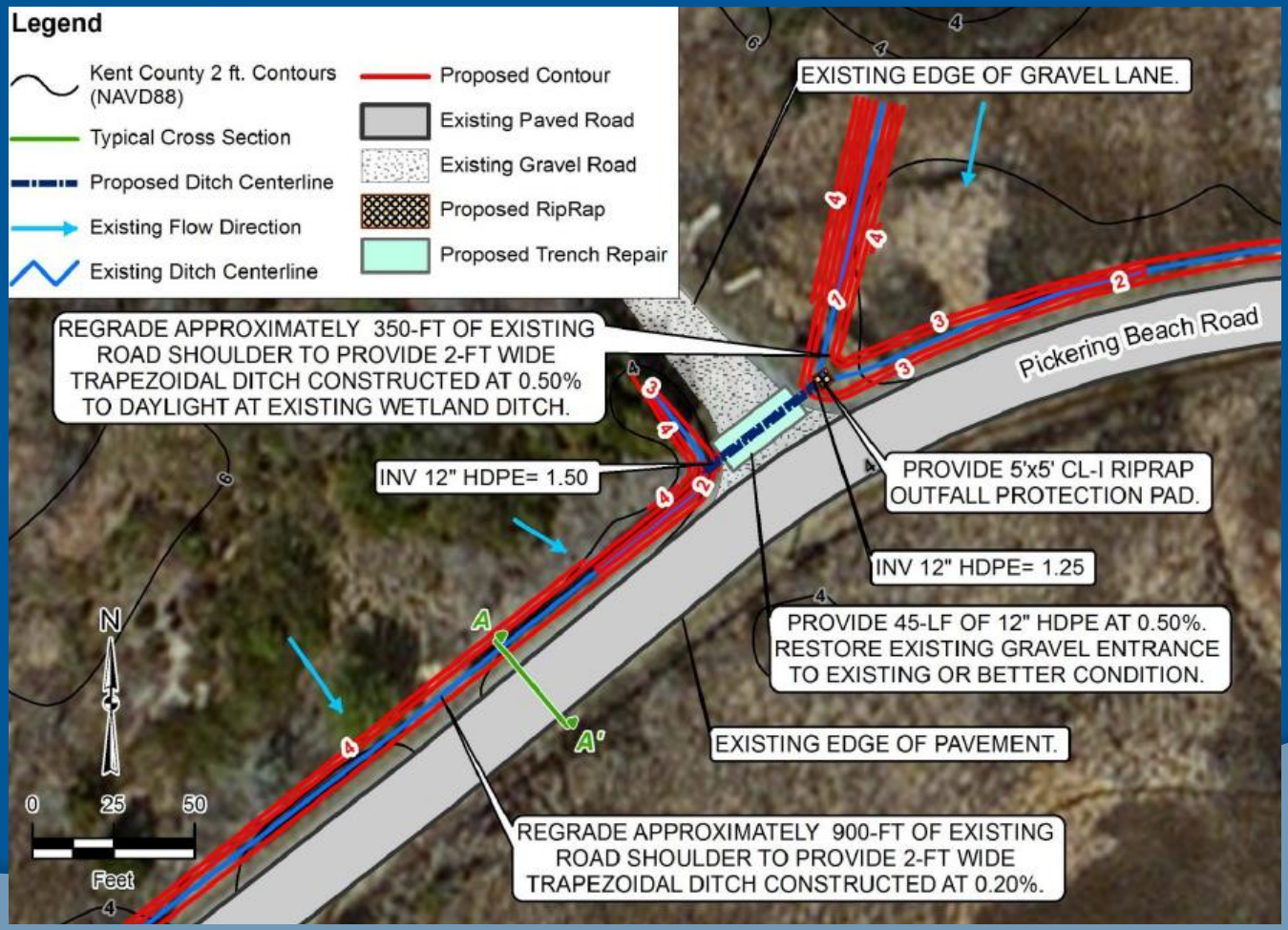
Project	Community	Location	Total Cost
Project #6 *(PH_04)*	*Primehook Beach*	9282 – 9316 Shore Drive	$94,000
Project #7 (BK_03)	*Broadkill Beach*	1614 N. Bay Drive	$37,000
Project #8 (BK_05)	*Broadkill Beach*	103 California Ave.	$27,000
Project #9 (BK_06)	*Broadkill Beach*	6 and 7 Arizona Ave	$40,000
Project #10 (LB18)	*Lewes Beach*	Intersection of Cape Henlopen Dr. and Fort Lewes Ct.	$66,000

South Bowers

- Only solutions recommended by URS is to significantly raise the road.
  - Outside DNREC Drainage program Area of Expertise
  - DNREC has provided a copy of the Report to DelDOT
- Subsequent to completion of this report DNREC has surveyed the marsh “ditches” and URS will provide an impact analysis of ditch cleanout as part of the next phase.

Project #1

Pickering Beach (PB_04)



Project Highlights

- Regrade 1250’ of shoulder to provide roadside ditch
- Install 12” Pipe under gravel lane

Costs

Eng.	$ 20,000
Const.	$ 30,318
Total	$ 50,318

Project #2

Kitts Hummock (KH_06)

Project Highlights

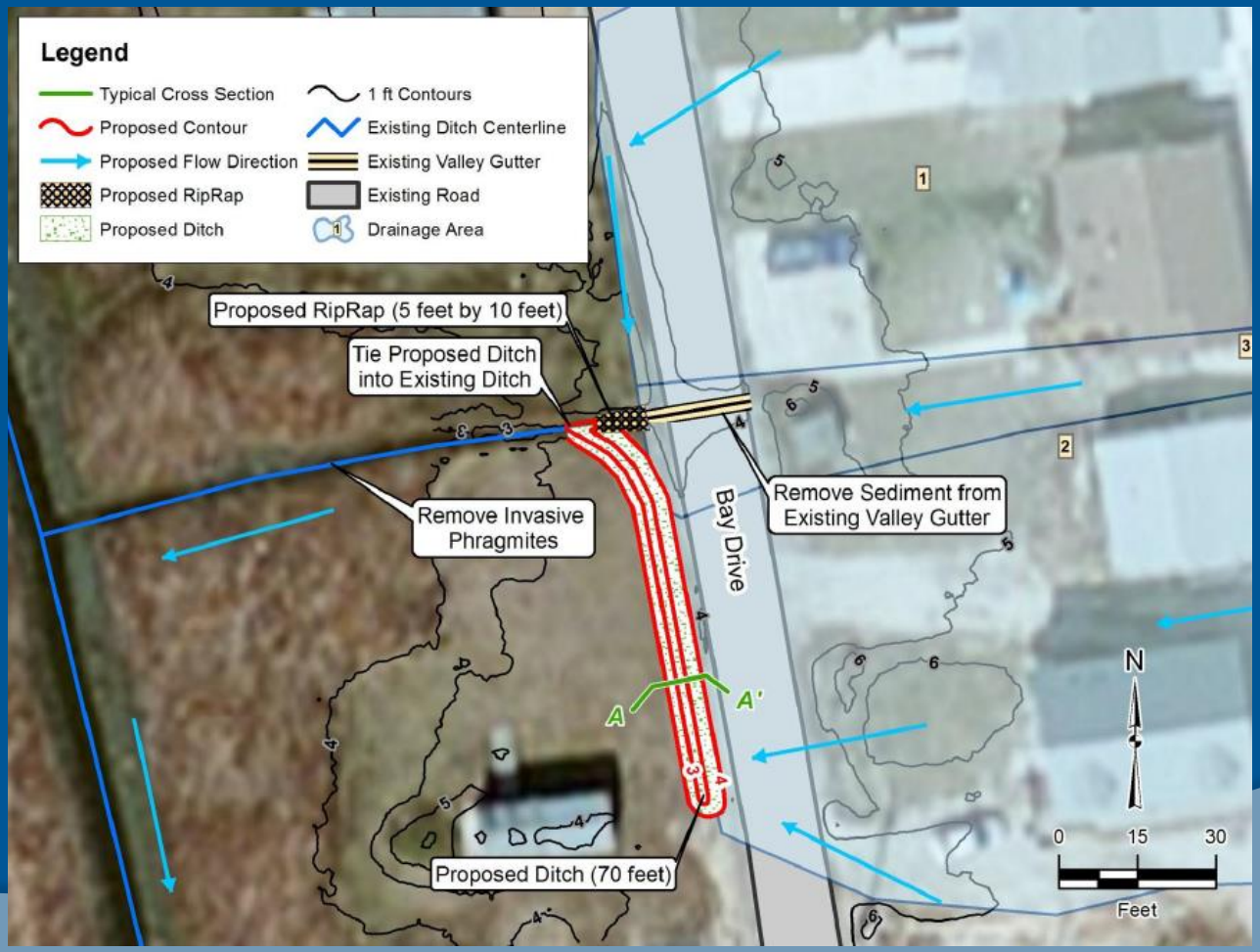
- Storm Drain w/ CBs
- Culvert under S. Bay Drive
- Backflow Prevention

Costs

Eng.	$ 20,000
Const.	$ 33,044
Total	$ 53,044

Project #3

Kitts Hummock (KH_06)



Project Highlights

- Treat and remove Phragmites
- 70'of roadside ditch
- Maintain valley gutter

Costs

Eng.	$ 12,000
Const.	$ 6,500
Total	$ 18,500

Project #4

Kitts Hummock (KH_09)

<u>Project Highlights</u>

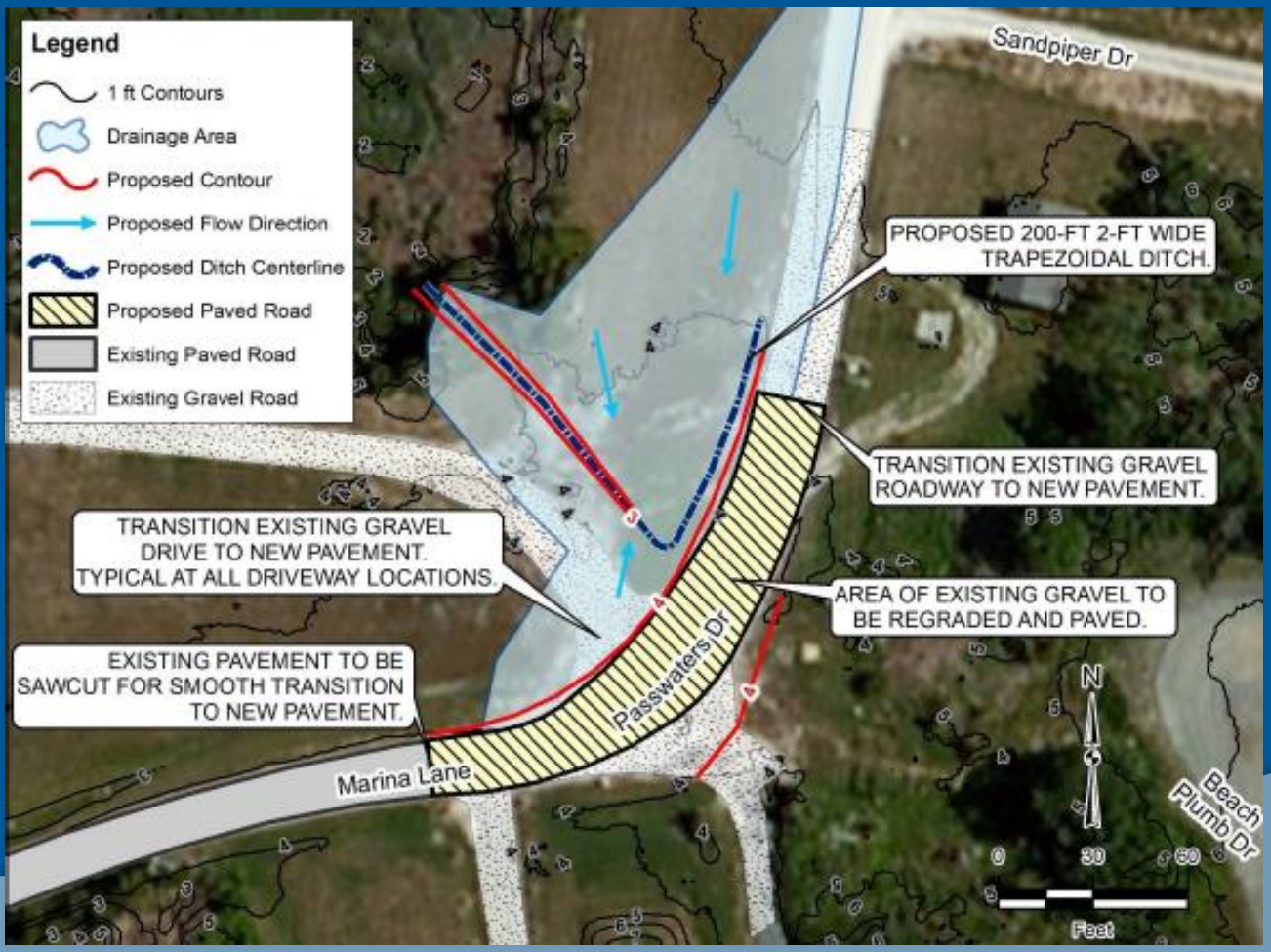
- Maintain and/or redefine existing roadside ditches

<u>Costs</u>

Eng.	$ 30,000
Const.	$ 53,280
Total	$ 83,280

Project #5

Slaughter Beach (SL_02)



Project Highlights

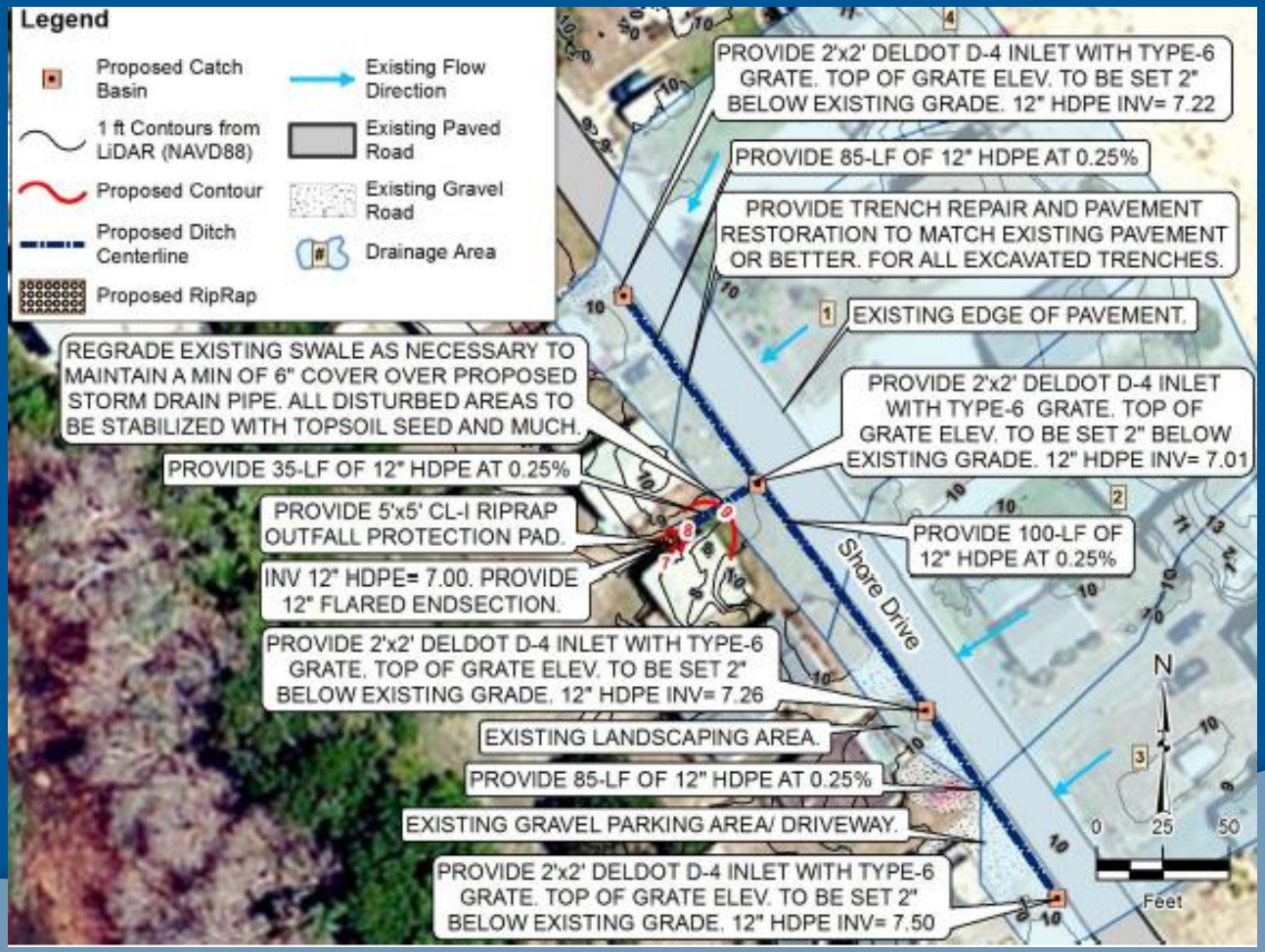
- Regrade pavement section
- Construct roadside swales
- Add swales

Costs

Eng.	$ 45,000
Const.	$ 102,082
Total	$ 147,082

Project #6

Primehook
(PH-04)



Project Highlights

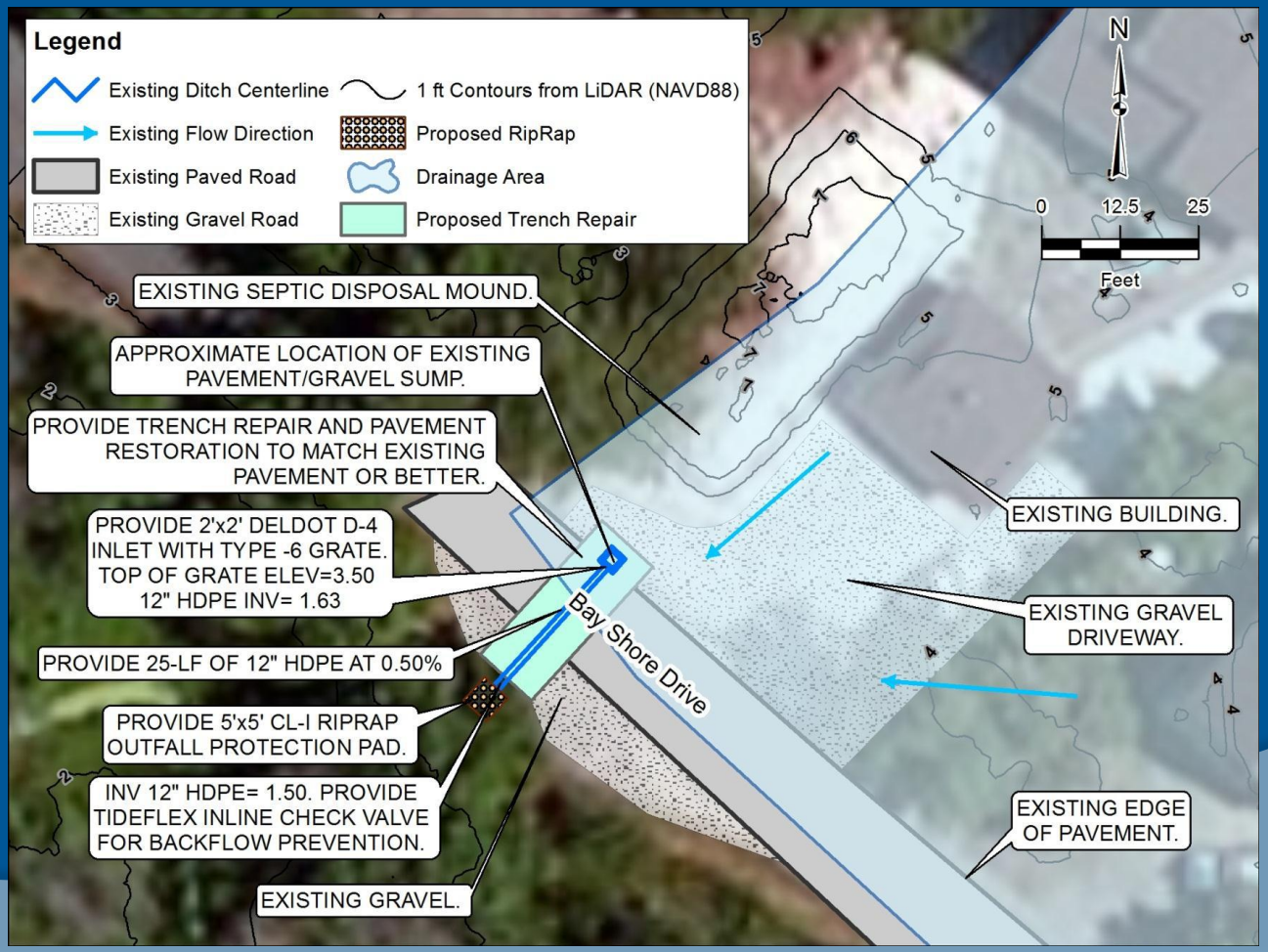
- Storm drain with CBs
- Riprap outlet protection

Costs

Eng.	$ 35,000
Const.	$ 59,148
Total	$ 94,148

Project #7

Broadkill Beach (BK_03)



Project Highlights

- Place new drainage inlet on North side of Bay Shore Drive
- Install drainage pipe across Bay Shore Dr
- Place Tideflex gate to prevent tidal backflow across Bay Shore Drive

Costs

Eng.	$ 14,000
Const.	$ 23,190
Total	$ 37,190

Project #8

Broadkill Beach
(BK_05)

Project Highlights

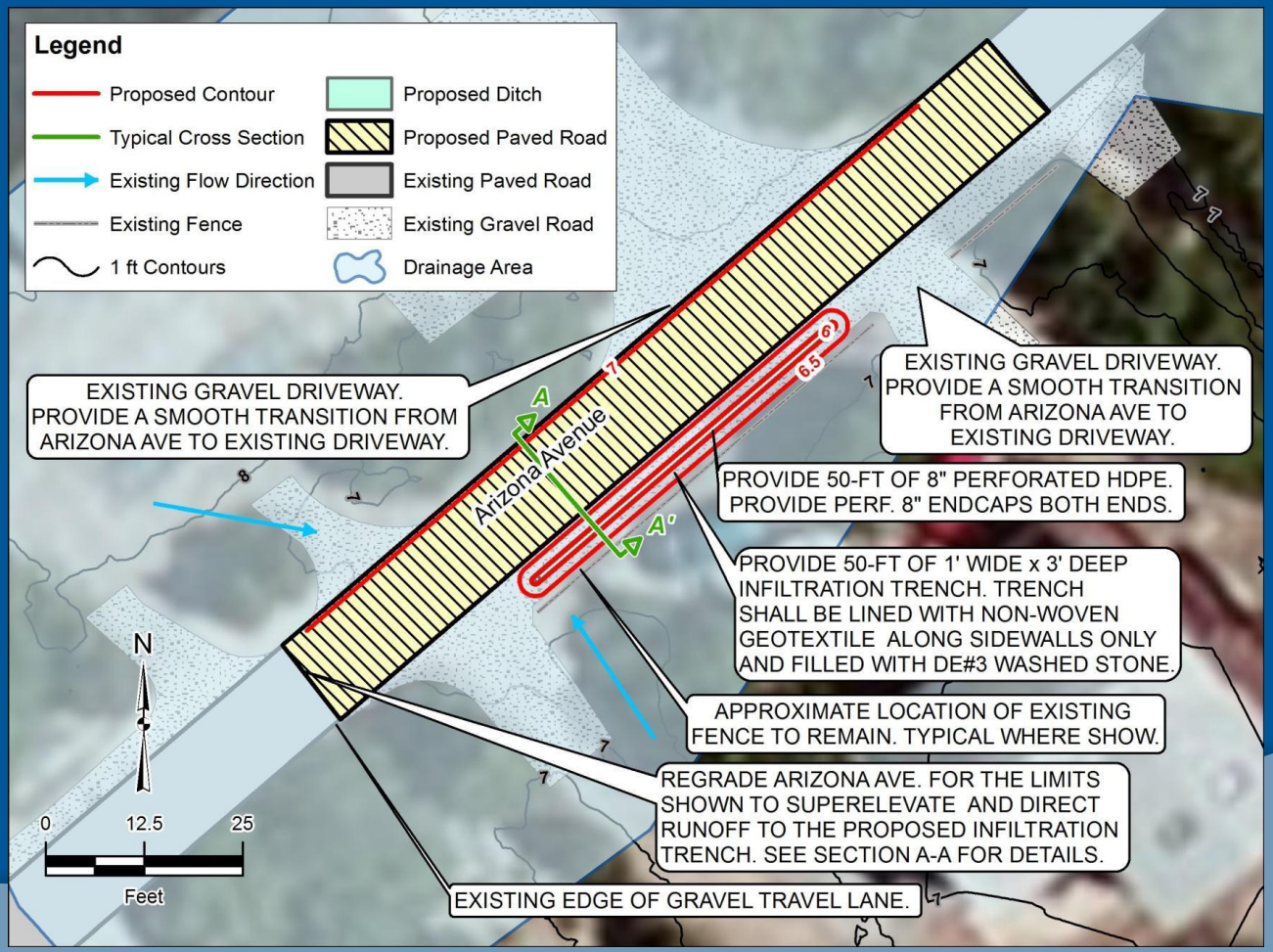
- Regrade & Raise California Ave to drain roadway
- Current roadway is lower that surrounding lands that drain

Costs

Eng.	$ 14,000
Const.	$ 13,332
Total	$ 27,332

Project #9

Broadkill Beach
(BK_06)



Project Highlights

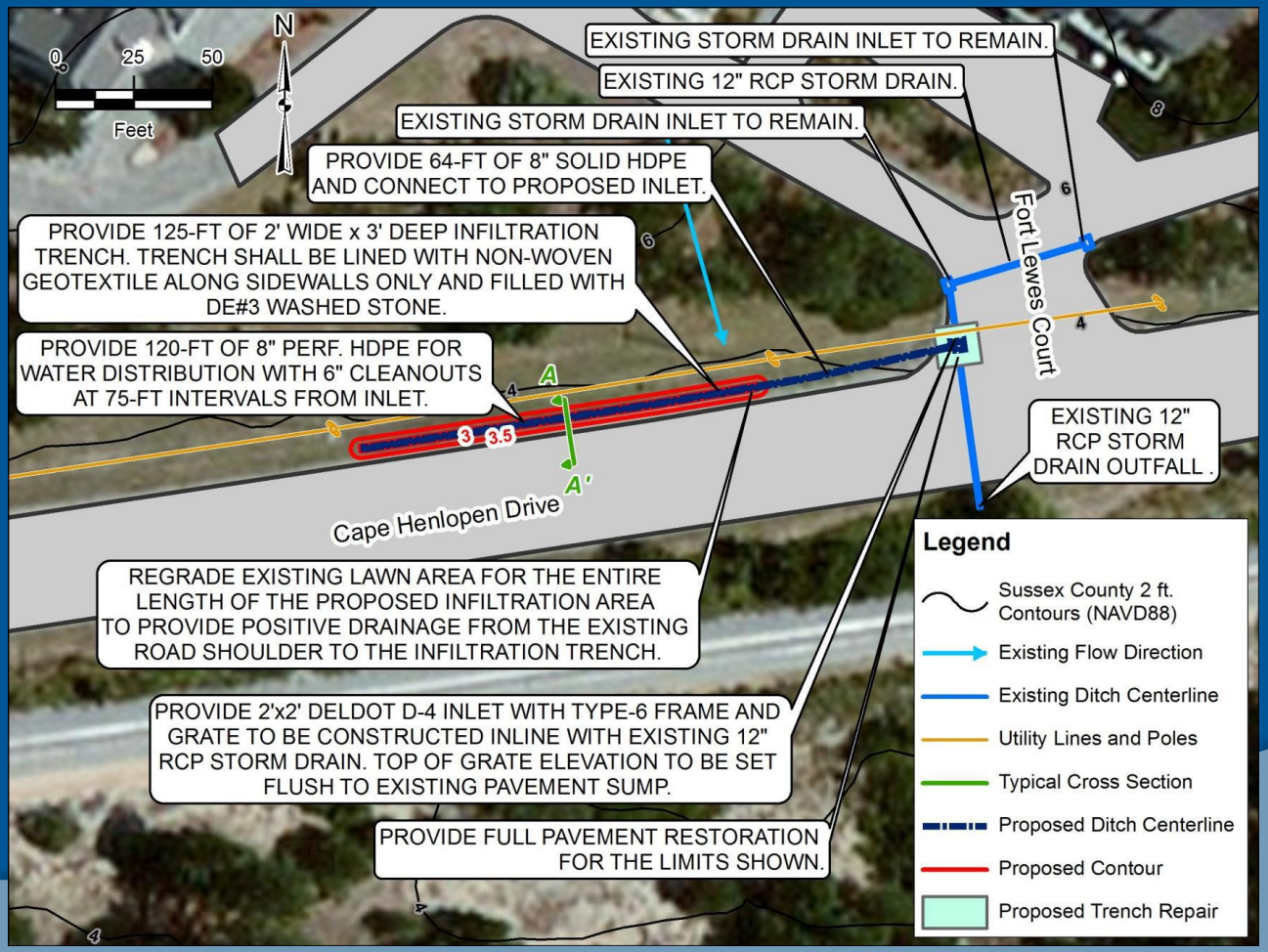
- Regrade/Repave Arizona Ave. to drain roadway
- Excavate Roadside infiltration swale with perforated storage pipe
- Regrade existing driveways to provide positive drainage

Costs

Eng.	$ 18,000
Const.	$ 21,375
Total	$ 39,735

Project #10

Lewes Beach
(LB_18)



Project Highlights

- Roadside infiltration system with overflow into existing Storm Drain
- Regrade Existing Roadside lawn
- Add DelDOT Inlet with grate for Cape Henlopen Drive drainage

Costs

Eng.	$ 26,000
Const.	$ 40,276
Total	$ 66,276

Next Steps

- Proceed with engineering to produce construction documents for the 5 high priority projects
- Drainage Program staff will reach out and provide technical assistance to landowners with solutions identified as “Homeowner Implementation”
- Drainage Program Staff to work with landowners and DelDOT staff as appropriate to address small high ranked solutions.
- Identify opportunities to fund construction / implementation
  - State Budget Process
  - Grants
  - Loans

Public Comments & Questions

Contact Information

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Drainage Program, Georgetown Field Office (302) 855-1930
Drainage Program, Dover Office (302) 739-9921

http://www.dnrec.delaware.gov/swc/Pages/DrainageTaxDitchWaterMgt.aspx